



# The College Board Review

## In This Issue

Mathematics Scores Compared	81
West Coast Members Meet	81
Fourteenth Grade Tests Proposed	82
Open House At Board Offices	82
Knights of Columbus Scholarships	82
Freshman Applications Down	83
College Choice Statements	83
June 15 Agreement	83
Committees Of Examiners	88

## West Coast Member Colleges Meet At Berkeley, California

The first regional meeting of the Board to be held west of the Rocky Mountains met in Berkeley, California, on March 12. The conference was called to discuss problems common to the Pacific Coast colleges. Board members on the Coast are Mills, Occidental, Pomona, Scripps, Stanford, Whitman, and the Universities of California, Southern California, and Washington.

Deans Hawkes of Mills, Sanders of Pomona, and McClane of Whitman led a symposium on admissions problems. Other speakers were Herman A. Spindt of the University of California, Henry Chauncey, President of the Educational Testing Service, and Frank H. Bowles, Director of the Board. The Chairman of the Board, Professor Edward S. Noyes of Yale, presided.

## Scores On Board Mathematics Examinations Compared

The College Board offers three mathematics tests, each a part of one of the three morning programs. Program 1 includes the mathematics section of the Scholastic Aptitude Test; Program 2, the Intermediate Mathematics Test; Program 3, the Comprehensive Mathematics Test. Each test is designed primarily for students with a particular amount or recency of training. Program 1 is designed for students with less than two and one-half years of mathematics or for students not presently studying mathematics; Program 2, for students with two and one-half to three years of mathematics; Program 3, for students with three and one-half to four years of mathematics, including trigonometry. The candidate's choice of program depends largely upon the requirements of the colleges, but there is some latitude.

It is, of course, important for the colleges and schools to be able to compare scores made on the different tests by students of like ability and with like amounts and recency of training. It becomes equally important to know how great or how little is the effect upon scores of additional training in mathematics or of a lapse of time between training and examination.

(Continued on page 84)

## THE COLLEGE BOARD REVIEW

News and Research of the  
College Entrance Examination Board

Published quarterly by the  
College Entrance Examination Board  
425 West 117th Street, New York 27, N.Y.

Director . . . . . Frank H. Bowles

Secretary . . . . . William C. Fels

## Board Will Consider Testing At Fourteenth Grade Level

Upon invitation of the College Entrance Examination Board and as guests of the University of Michigan, a group of representatives of senior and junior colleges, educational associations, the Educational Testing Service, and the U. S. Office of Education met on February 7 and 8 to consider the desirability of a nationally standardized program of aptitude and achievement tests to be given near the end of the second college year. The group recommended that the Board undertake the development of an examination program and offer one series of fourteenth year examinations in the spring of 1950. The Executive Committee is expected to consider this proposal in April.

The representatives agreed that such a program would serve many needs. It would form one element in predicting success in the last two years of senior college work. It would also serve as a broad measure of achievement of senior and junior college students and of persons who had enjoyed a minimum of formal education.

The group agreed upon the importance of devising a program that would not influence the pattern and content of college courses, or that would hold such influence to the irreducible minimum.

## Headmasters And Principals Welcomed At Board Offices

More than a hundred headmasters and principals attending the Forum on Democracy, at Columbia College, and the meeting of the Headmasters Association at Rye, New York, were invited to an Open House at the Board's redecorated offices, 425 West 117 Street in New York City, on February 12.

Speaking briefly to the group, Mr. Bowles, the Director, expressed his desire that schoolmen, parents, and candidates should consider the Board's offices a center of information on college entrance matters. He emphasized that the Board's appointed officers look upon service to the schools as one of their most important duties.

## New York Knights of Columbus Use Tests To Select Scholars

The New York State Council of the Knights of Columbus has been added to the growing list of scholarship sponsors using College Board tests for selection purposes.

The Educational Testing Service supplied the Knights of Columbus with a screening test which was administered in January 1949 to approximately 2,200 boys and girls in high schools throughout New York State. The 5 highest candidates in each of the 8 scholarship districts—5 for boys, 3 for girls—will take Program 2 and certain afternoon achievement tests at the April 1949 series of Board tests as the second and final stage in this competition. The Knights of Columbus will award a scholarship to the highest scoring candidate in each of the 8 scholarship districts. The scholarships are four-year scholarships for use at any Catholic college in the United States.

## Freshman Applications Down Twenty Percent, Survey Shows

Seventy-two of the hundred and one colleges polled in the College Board's monthly estimate of the admissions situation in the member institutions reported that they had received fewer applications by January 31, 1949, than by the same date last year. Only eight colleges, four for women and three coeducational, reported receiving more. Three institutions are in the same position as last year. The remaining eighteen did not report or had insufficient data.

Men's colleges, on the average, are down 28%, women's 10%, and coeducational institutions 19%. The average drop for all colleges, taking into account the size of the colleges, is 20%.

That this drop will not seriously affect freshman registrations is indicated by the same colleges' estimate that they will register only 4% fewer freshmen than last year. In most cases the planned reduction in freshman registration represents an attempt to return to the normal capacities of the colleges.

## Colleges Publish Statements Concerning College Choice

At the October meeting of the Board a resolution was passed urging the member colleges to state their practices in regard to the use of the college preference information required of candidates for the Board's examinations. Most member colleges have now issued statements, or included instructions in their catalogues.

A compilation of all statements received by the Board before March 1 has been prepared. Copies will be mailed by the New York office upon request.

The new college choice rule, which permits candidates to express a full range of preferences, or no preference, will go into effect with the April series of tests and will apply to candidates for the June and August series as well.

## Additional Colleges Agree On June 15 Acceptance Date

Thirty-six member colleges have notified the Secretary of the Board of their willingness to participate in the so-called "June 15" agreement. The text of the agreement and the participating institutions follow:

The institutions listed below have, by common agreement, bound themselves not to require any candidate admitted as a freshman to give notice before June 15 of his decision to attend one of these institutions or to accept financial aid from it.

This policy has been agreed upon so that a candidate may be able to give consideration to all opportunities available to him. It should be emphasized, however, that whenever a student can reach a decision before this date, he may with propriety notify the institutions.

Adelphi College	Randolph-Macon Woman's College
Barnard College	Rutgers University
Bowdoin College	Simmons College
Brown University	Skidmore College
Bryn Mawr College	Smith College
Columbia University	Swarthmore College
Connecticut College	Sweet Briar College
Cornell University	University of Chicago
Dartmouth College	University of Pennsylvania
Goucher College	University of Virginia
Harvard College	Vassar College
Haverford College	Washington and Jefferson College
Massachusetts Institute of Technology	Wellesley College
Mount Holyoke College	Wells College
New Jersey College for Women	Western Reserve University
Pembroke College	Wheaton College
Pomona College	Wilson College
Princeton University	Yale University

## Mathematics Scores—*(Continued)*

To gain information on these points a study was made of the April 1948 test results. The conclusions reached were as follows:

1) On the average, students with equal ability, who were just completing four years of training, made equivalent scores on the mathematics sections of Programs 1 and 3. The mathematics scores of the students who took Program 2, however, averaged about 25 points higher than the scores of comparable students who took either of the other two programs.

(Beginning with the January 1949 series, scores on the Intermediate Mathematics Test will be adjusted for the difference found in the study so that scores from all three programs will be, on the average, equivalent for persons with an equal amount and an equal recency of mathematical training.)

2) On Program 1 or 2 scores, an allowance of about 40 points should probably be made when students in their third year of mathematics are compared with those in their fourth year. Program 3 is taken only by students with four years of training.

3) In general, no allowance need be made when Program 1 scores of students who are taking mathematics at the time of their examination are compared with those of students who completed their last course a year previous to their examination. (Most Board candidates take the tests within one year after finishing their last course in mathematics.)

4) An allowance of about 25 points should probably be made if the Program 2 score of a person who has not had mathematics for a year is to be compared with the Program 2 score of another person who has just finished or is presently taking a mathematics course.

The study on which these conclusions were based made use of a detailed questionnaire which all April 1948 College Board candidates were asked to complete. Since the questionnaire requested full information as to the amount and recency of the examinees' mathematical training, it was possible to study these factors in

relation to the morning programs actually taken by the candidates.

Groups which were alike in choice of program, or in amount of training, or in recency of training were isolated. From among these, subgroups which were alike in two characteristics but different in the third characteristic were selected and compared. For example, among those candidates who chose Program 2 and had three years of mathematical training, two subgroups could be distinguished: one composed of candidates who would finish their last mathematics course in 1948; the other, of candidates who completed their last course in 1947. Study of these two subgroups provided an evaluation of the effect of recency of training.

When the effect of any single factor, such as recency of training, was evaluated, it could not be assumed that the candidates in each of the two subgroups to be compared were equal in basic mathematical ability. Considerable thought was devoted to the selection of a measure of this capacity for mathematics. It was finally decided to use as a measure the student's mark in ninth-grade mathematics (usually elementary algebra).

The fallibility of this method was fully realized. It is well known that marks cover many more elements than just ability in the subject and that they vary greatly from school to school. On the other hand, the ninth-grade mathematics mark is indicative of the student's readiness for advanced mathematical preparation and is based on a course which is reasonably similar in content from school to school. In any case, the use of large numbers of students and the study of average values should counteract some of the inadequacies involved in this procedure. A desirable alternative measure would have been scores on a standardized mathematics test administered before the students entered high school. Because no scores of this kind were available for last June's graduates and because no results from a study such as this could be determined for four years if a test were administered to students currently entering secondary school, the mathematics mark appeared to be

the only practicable means of equating groups.

The students included in the study were selected to be representative of the entire population which took the College Board tests in April 1948. From a list of all schools which sent candidates to this series, a large number were selected at random and were asked to submit the ninth-grade mathematics marks for their pupils. A very large proportion responded. Because of possible variation in the general educational situations as well as in the grading systems, it seemed advisable to make all computations separately for public and independent schools.

All the comparisons made in this study were corrected by the statistical technique known as the analysis of covariance for inequalities among the groups in basic mathematical ability (as determined by their marks in ninth-grade mathematics). The amount of correction introduced depends upon the extent of the difference in the basic ability and upon the correlation between the ability and the test scores.

The results of the study are presented in three tables. Table 1 compares groups otherwise equal who took different programs; Table 2, groups with different amounts of training but other-

wise equal; Table 3, groups of candidates otherwise equal who finished their last mathematics course at different times. In each table the first three columns identify the groups. Each pair of horizontal lines compares two groups different in the characteristic under consideration but alike in the other characteristics. The data for public and independent schools are presented separately.

The two columns headed "C.E.E.B. Score Difference Corrected" are of greatest interest. They report the number of score points of difference between the two groups in each pair, after the difference has been corrected for any inequality between the groups in basic mathematical ability.

The coefficients of correlation between ninth-grade mathematics marks and test scores, tabulated in two other columns, range from .12 to .51 and average about .38 for public schools and .23 for independent schools. These figures are not so high as would have been desirable for the purposes of the study. Had a better index of basic mathematical ability been available, it would probably have raised these coefficients.

Table 1 compares groups of candidates who

TABLE 1  
Comparisons of Mathematics Scores  
Made by Groups Taking Different Programs

GROUPS			PUBLIC SCHOOLS					INDEPENDENT SCHOOLS				
Program Taken	Amount of Training	Years Since Last Course	Number of Students	Average 9th-Grade Math. Mark	Average CEEB Math. Score	Correl. Between Mark and Score	CEEB Score Difference Corrected*	Number of Students	Average 9th-Grade Math. Mark	Average CEEB Math. Score	Correl. Between Mark and Score	CEEB Score Difference Corrected*
1	3	0	249	84	479	-.35	+.27	197	80	485	.29	
2			296	87	514	.34		234	78	526	.26	+.44
1	3	1	353	84	471	-.32	+.19	317	80	479	.12	
2			281	85	493	.37		266	80	498	.16	+.20
1	4	0	171	86	532	-.51	+.35	174	81	528	.34	
2			563	87	571	.39		340	80	547	.26	+.20
2	4	0	563	87	571	.39	-.35	340	80	547	.26	-.12
3			553	89	546	.39		411	82	539	.18	
1	4	0	171	86	532	-.51	-.00	174	81	528	.34	
3			553	89	546	.39		411	82	539	.18	+.07

\* This figure is the difference between the two "Average C.E.E.B. Math. Scores" in the sixth column corrected for differences in ninth-grade mathematics marks which were used as a measure of "basic mathematical ability." Positive difference means higher scores were made on higher-level program; negative difference means lower scores were made on higher-level program.

for one reason or another chose to take different programs but whose training was alike in amount and recency. Of course, only candidates with two and one-half to four years of training had any real choice. A candidate with less than two and one-half years of mathematics could have taken only Program 1.

Reference to the "C.E.E.B. Score Difference Corrected" columns in Table 1 will show that advanced students who elected Program 1 and Program 3 made approximately the same average score. The corrected differences are 0 for the public-school population and 7 for the independent-school population. That is, the superiority in ninth-grade mathematics of the students with four years of preparation who chose Program 3 accounts for all the difference in the uncorrected test scores.

The same columns, "C.E.E.B. Score Difference Corrected," indicate an average difference of about 25 points in favor of students with the same amount and recency of training who elected Program 2 rather than Program 1 or 3.

This was true for both public- and independent-school students. The difference cannot be regarded as a mere chance occurrence. As mentioned earlier, the scores on the Program 2 mathematics test will be adjusted beginning with the January 1949 series so that scores from all three programs will be, on the average, equivalent for persons with equal amount and recency of training. Henceforth, mathematics scores on Programs 1, 2, and 3 will then be directly comparable.

Table 2 compares groups of candidates with different amounts of training, all of whom were studying mathematics at the time the examination was taken and who chose the same program. The results indicate that the fourth year of mathematics brings about an increase of 35 to 40 points on either Program 1 or 2. All the increases are in the expected direction. None can be assumed to be merely the result of chance fluctuations in the data. Although the "Corrected Difference" is larger in Program 2 than in Program 1 for the public schools, the reverse

TABLE 2  
Comparisons of Mathematics Scores  
Made by Groups with Different Amounts of Training

GROUPS			PUBLIC SCHOOLS				INDEPENDENT SCHOOLS					
Program Taken	Amount of Training	Years Since Last Course	Number of Students	Average oth-Grade Math. Mark	Average CEEB Math. Score	Correl. Between Mark and Score	CEEB Score Difference Corrected*	Number of Students	Average oth-Grade Math. Mark	Average CEEB Math. Score	Correl. Between Mark and Score	CEEB Score Difference Corrected*
1	3	0	249	84	479	-.35	+45	197	80	485	.29	+39
	4		171	86	532	-.51		174	81	528	.34	
2	3	0	296	87	514	-.34	+56	234	78	526	.26	+15
	4		563	87	571	-.39		340	80	547	.26	

\* Positive difference means higher scores were made by students with greater amounts of training.

is true for the independent schools. The difference for both programs is larger in the public schools than in the independent schools.

Whether the rises found are due to the learning of specific material or to a more general advancement in mathematical maturity cannot be determined from these statistics.

Only the three-to-four-year-training differ-

ential is included since the number of two-year students was not sufficient for reliable comparison. (It is interesting to notice that the mathematical section of the Scholastic Aptitude Test is apparently being taken largely by students who have had more than the minimum amount of preparation.) Evidence is not available concerning the effect of additional training on can-

dicates for Program 3. It would be abnormal for a candidate to take that test with less than the full amount of academic preparation.

Table 3 compares groups of candidates studying mathematics at the time they took the test with groups that had discontinued their study approximately a year before. The groups compared were alike in amount of training and in program taken. As most Board candidates take the tests within one year after finishing their last course in mathematics, it was impossible to find satisfactory groups with two or more years' lapse between last course and test.

For the one-year interval, the conclusions seem clear and consistent for both types of

schools. The loss after one year's inactivity is very slight on Program 1, being about 7 or 8 points. As might be expected, the Program 2 scores decline more markedly, between 16 and 31 points, but the contrast with Program 1 is not great. No evidence is available for Program 3, since almost all candidates who take this program do so while studying fourth-year mathematics.

The effect of recency would appear to be considerably less than one would expect. There may be a number of explanations for this. Certainly many of the applicants who have not had mathematics immediately prior to the testing do some informal reviewing or "brushing up"

TABLE 3  
Comparisons of Mathematics Scores  
Made by Groups Who Have Finished Their Last Mathematics Course at Different Times

GROUPS			PUBLIC SCHOOLS				INDEPENDENT SCHOOLS					
Program Taken	Amount of Training	Years Since Last Course	Number of Students	Average 9th-Grade Math. Mark	Average CEEB Math. Score	Correl. Between Mark and Score	CEEB Score Difference Corrected*	Number of Students	Average 9th-Grade Math. Mark	Average CEEB Math. Score	Correl. Between Mark and Score	CEEB Score Difference Corrected*
1	3	0	249	84	479	.35	-.08	197	80	485	.29	-.07
		1	353	84	471	.32		317	80	479	.12	
2	3	0	296	87	514	.34	-.16	234	78	526	.26	-.31
		1	281	85	493	.37		266	80	498	.16	

\* Negative difference indicates loss with the passage of time.

which would not reveal itself as formal study but which would bring about definite improvement in performance. The tendency to a review of this kind would perhaps be greater among candidates planning to take the Intermediate Mathematics Test because it is designed for a higher level of achievement. If achievement material is forgotten more readily than is aptitude material, more intensive review by Program 2 candidates would tend to conceal the real contrast between Programs 1 and 2.

The results of the study are summarized at the beginning of this article. A word of caution should, however, be added. The study dealt with group averages. None of the evidence gives any

indication whatsoever with respect to the behavior of any one *individual*. For example, while it does not matter on the *average* whether students with four years of mathematics elect Program 1 or 3, some *individuals* would show more aptitude than achievement, others more achievement than aptitude. The former might have higher scores on Program 1, the latter on Program 3.

*The authors of this study are Douglas Schultz of the Research Department and Lynnette B. Plumlee of the Test Construction Department of the Educational Testing Service.*

# Examiners For 1950 Achievement Tests

The College Board's achievement examinations in twelve subject matter fields are prepared by examining committees ordinarily composed of five members, of whom three represent the colleges and two the secondary schools. The chairman may be a teacher at either the college or secondary school level. To the committees fall the responsibility of planning the examinations,

of determining the percentage of questions to be devoted to each aspect of a subject, of preparing and editing the questions, and even of reading proof when the tests reach the printing stage. The committees have at their disposal the excellent test construction, analysis, and research facilities of the Educational Testing Service in Princeton, New Jersey.

**BIOLOGY.** Mr. Thomas F. Morrison, Milton Academy, *Chairman*; Professor Elso S. Barghoorn, Harvard University; Professor Herbert C. Knutson, Rhode Island State College; Dr. Charles Tanzer, DeWitt Clinton High School (Bronx, N. Y.); Professor Robert H. Woodworth, Bennington College.

**CHEMISTRY.** Professor Stuart R. Brinkley, Yale University, *Chairman*; Dr. Otis E. Alley, Winchester High School (Winchester, Mass.); Professor Ina M. Granara, Simmons College; Dr. Curtiss S. Hitchcock, Lawrenceville School; Professor Margaret W. Kelly, Connecticut College.

**ENGLISH.** Professor William M. Sale, Jr., Cornell University, *Chairman*; Professor Scott Elledge, Carleton College; Professor Lucy Le Hook, Barnard College; Professor Edna R. Williams, Smith College; Mr. Charles Rice, Choate School.

**FRENCH.** Dr. Nelson H. Brooks, Westover School, *Chairman*; Professor Frederick B. Agard, Cornell University; Miss Anne Marie de Commaille, The Spence School; Professor Henry Dupont, Hunter College; Professor H. Linn Edsall, Wayne University.

**GERMAN.** Professor Victor Lange, Cornell University, *Chairman*; Professor Paul G. Graham, Smith College; Mr. Robert W. Kesler, Phillips Exeter Academy; Dr. Maxim Newmark, Brooklyn Technical High School (Brooklyn, N. Y.); Professor Arthur J. Watzinger, Boston University.

**GREEK.** Dr. Henry Phillips, Phillips Exeter Academy, *Chairman*; Professor Samuel D. Atkins, Princeton University; Professor Malcolm MacLaren, Jr., Syracuse University; Professor John B. McDiarmid, Johns Hopkins University; Dr. William H. Marnell, Boston Public Latin School (Boston, Mass.).

**ITALIAN.** Professor A. T. MacAllister, Princeton University, *Chairman*; Mr. Francis Baccari, South Philadelphia High School (Philadelphia, Pa.); Professor Salvatore J. Castiglione, Yale University; Professor Maria Piccirilli, Vassar College; Dr. Louis Sorrieri, New Utrecht High School (Brooklyn, N. Y.).

**LATIN.** Professor Lucius R. Shero, Swarthmore College, *Chairman*; Mr. John K. Colby, Phillips Academy (Andover, Mass.); Dr. George Land, Newton High School (Newtonville, Mass.); Professor Charles T. Murphy, Oberlin College; Professor John W. Spaeth, Jr., Wesleyan University.

**MATHEMATICS.** Professor John R. Kline, University of Pennsylvania, *Chairman*; Professor Raymond D. Douglass, Massachusetts Institute of Technology; Mr. Arthur F. Leary, Hyde Park High School (Boston, Mass.); Dr. William S. Litterick, Peddie School; Dr. Frederic H. Miller, Cooper Union.

**PHYSICS.** Professor Alan T. Waterman, Yale University, *Chairman*; Dr. Alexander Efron, Stuyvesant High School (New York, N. Y.); Professor Paul A. Northrop, Vassar College; Professor Richard M. Sutton, Haverford College; Mr. Howard A. Taber, Hotchkiss School.

**SOCIAL STUDIES.** Mr. Henry W. Bragdon, Phillips Exeter Academy, *Chairman*; Professor Harry D. Berg, Michigan State College; Dr. Margaret Hastings, New Jersey College for Women; Professor Arthur Link, Jr., Princeton University; Mr. Richard M. Perdew, Bronxville Senior High School (Bronxville, N. Y.).

**SPANISH.** Professor Edith F. Helman, Simmons College, *Chairman*; Professor Ernest H. Hespelt, New York University; Professor Rose E. Martin, Middlebury College; Mr. Donald D. Walsh, Choate School; Mrs. Naomi W. Zieber, Philadelphia High School for Girls (Philadelphia, Pa.).

